

## High-Range Scalar Helium Magnetometer (HSHM), Phase I

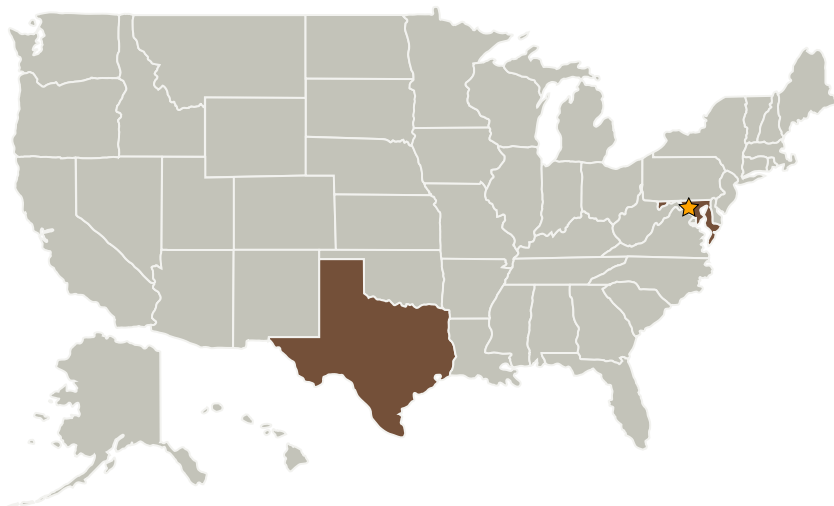
Completed Technology Project (2008 - 2008)



## Project Introduction

This SBIR Phase I proposal describes development of a conceptual design for a High-range Scalar Helium Magnetometer (HSHM) for the field range  $\pm 16$  Gauss. The HSHM conceptual design will establish the feasibility of a model brass-board HSHM in Phase II. The HSHM instrument is capable of making scalar measurements of Earth and planetary magnetic fields over a range of  $\pm 16$  G using a digital resonance loop design already demonstrated in the Juno SHM instrument. The major HSHM design innovation is use of a new fiber-coupled laser pump-source and resonance drive. The laser pump-source permits miniaturization of the sensor unit by eliminating three helium lamps and a helium cell, as well as the resonance RF drive cables and RF resonance coils at the sensor. This innovation permits reduction of the sensor volume by a factor of 10 while decreasing sensor power and mass. The HSHM can achieve a scalar accuracy of 1 nT, and sensitivity of 5 pT/%Hz. The Phase I conceptual design will guide the design and fabrication of a brass-board HSHM model using advanced laser and digital components in Phase II. A test and calibration protocol will be developed for the HSHM calibration in Phase II.

## Primary U.S. Work Locations and Key Partners



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## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Goddard Space Flight Center (GSFC)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Polatomic, Inc.	Supporting Organization	Industry	Richardson, Texas

## Primary U.S. Work Locations

Maryland	Texas
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## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

**Principal Investigator:**

Robert Slocum

## Technology Areas

**Primary:**

- TX08 Sensors and Instruments
  - └ TX08.3 In-Situ Instruments and Sensors
    - └ TX08.3.1 Field and Particle Detectors